

Serial No. 09/839,941

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### Remarks

The Applicant first wishes to thank the Examiner for the courtesy extended to Applicant's attorney during the telephonic interview on September 4, 2003 during which the pending claims and art of record including Chen (US 6,104,074); Tischler et al. (US 5,679,152); Tadatomo et al. (US 6,225,650); Soares (US 6,034,404); McTeer (US 6,258,466); Mueller (US 4,902,136); Gerner et al. (US 5,698,865) and Saito et al. (US 6,121,634) were discussed.

The Office Action, mailed on June 4, 2003, has been carefully considered. In that Office Action, the Claims 1-49 and 59-106 were rejected. After such consideration, Claims 1, 2, 5, 10, 59, 62, and 67 have been amended. Applicant reaffirms that Claims 50-58 and 107-123 have been canceled, without prejudice to the subject matter therein, as being directed to a non-elected invention. New claims 124 and 125 have been added. As such, Claims 1-49, 59-106, 124 and 125 remain in the case with none of the claims being allowed. Applicant respectfully requests reconsideration of the application by the Examiner in light of the above amendments and the following remarks offered in response to the Office Action, mailed on June 4, 2003.

Claims 1-5, 14, 18-19, 33, 36, 59-62, 71, and 75-76 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chen (US 6,104,074) in view of Tischler et al. (US 5,679,152) and Tadatomo et al. (US 6,225,650). Independent Claims 1, 59, 124 and 125 recite, in combination with other features, a homoepitaxially grown single crystal gallium nitride wafer. Applicant respectfully submits that the amendment of the independent Claims 1 and 59 renders the rejection moot. Further, Applicant submits that new Claims 124 and 125 are patentable.

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Applicant respectfully submits that, to establish a *prima facie* case of obviousness, the references must teach or suggest all of the claim limitations of the present invention. Accordingly, Applicant submits that neither Chen nor Tischler et al. nor Tadatomo et al., whether taken alone or in combination, teach or suggest all the elements of the claimed invention. Namely, none of the references teaches nor suggests a photodetector comprising a substrate comprising a homoepitaxially grown single crystal gallium nitride wafer, in combination with the other recited features. Chen discloses basal plane sapphire substrates (see, e.g., Col. 2, lines 27-28 and lines 35-37; Col. 3, lines 28-30; and Col. 4, lines 22-28, Col. 5, lines 48-49 and Col. 7, lines 39-61) not a single crystal gallium nitride substrate let alone as homoepitaxially grown single crystal gallium nitride. Tischler et al. teaches that a heteroepitaxially grown single crystal Ga\*N article grown on a material such as silicon, silicon carbide, gallium arsenide, sapphire (see, e.g., Col. 2, lines 42-44 and Col. 7, lines 21-23) by suitable techniques, such as vapor deposition techniques, including chemical vapor deposition (CVD), chemical vapor transport (CVT), physical vapor deposition (PVD), plasma-assisted CVD, etc. (see, e.g., Col. 7, lines 17-21). In a specific embodiment, Tischler et al. teaches heteroepitaxially growing GaN on silicon in a temperature range of 800°-1300°C using a vapor phase process (see, e.g., Col. 5, lines 49-52). Tadatomo et al. teaches heteroepitaxially growing a GaN group crystal layer on a base substrate the may be sapphire crystal (C face, A face), rock crystal, SiC and the like which are widely used to form GaN group crystal layers by any method (see, e.g., Col. 4, lines 12-16 and Examples) such as the hydride vapor phase epitaxy (HVPE) method, the Metalorganic Chemical Vapor Deposition (MOCVD) method, the Molecular Beam Epitaxy (MBE) method and the like (see, e.g., Col. 5, lines 10-12).

Applicant therefore submits that, because the combination of references cited by the Examiner neither teaches nor suggests all of the limitations of amended Claims 1 and 59, the rejection of the claims and the claims dependent thereon under 35 U.S.C. §103(a) as being unpatentable over Chen in view of Tischler et al. and Tadatomo et al. is successfully overcome.

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Claims 6-9, 15-17, 20-22, 63-66, 72-74, 77-79 and 107 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chen in view of Soares (US 6,034,404). As noted above, Chen discloses basal plane sapphire substrates not a single crystal gallium nitride substrate. As the shortcomings of Chen are not cured by Soares, the 35 U.S.C. 103(a) rejection of Claims 6-9, 15-17, 20-22, 63-66, 72-74, 77-79 and 107 is improper and should be withdrawn.

Claims 10-13 and 67-70 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chen in view of McTeer (US 6,258,466). As with Chen in view of Soares, the shortcomings of Chen are not cured by McTeer. As the shortcomings of Chen are not cured by McTeer, the 35 U.S.C. 103(a) rejection of Claims 10-13 and 67-70 is improper and should be withdrawn.

Claims 23-32, 34-35, 37-44, 80-92 and 94-101 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chen in view of Mueller (US 4,902,136) and Gerner et al. (US 5,698,865). As with Chen in view of Soares, the shortcomings of Chen are not cured by Mueller and Gerner et al. As the shortcomings of Chen are not cured Mueller and Gerner et al., the 35 U.S.C. 103(a) rejection of Claims 23-32, 34-35, 37-44, 80-92 and 94-101 is improper and should be withdrawn.

Claims 45-49 and 102-106 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chen (US 6,104,074) in view of Saito et al. (US 6,121,634). As with Chen in view of Soares, the shortcomings of Chen are not cured by Saito et al. As the shortcomings of Chen are not cured Saito et al., the 35 U.S.C. 103(a) rejection of Claims 45-49 and 102-106 is improper and should be withdrawn.

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In light of the amendment and remarks presented herein, Applicant submits that Claims 1-49, 59-106, 124 and 125 of the case are in condition for immediate allowance and respectfully requests such action. If, however, any issues remain unresolved, the Examiner is invited to telephone the Applicant's counsel at the number provided below.

Respectfully submitted,



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